Field Evaluation of 2B Technologies Portable Ozone Monitor (PO_3M)

South Coast AQMD

AQ-SPEC
Air Quality Sensor Performance Evaluation Center

Background

- From 07/29/2015 to 09/09/2015, three **2B Technologies Portable Ozone Monitor (PO_3M)** units were deployed at one of SCAQMD's stationary ambient monitoring sites in Rubidoux and run side-by-side with a Federal Reference Method (FRM) instrument measuring the same pollutant

- 2B Technologies PO_3M (*3 units tested*):
  - Gaseous sensors [UV absorption; Federal Equivalent (FEM) Method]
  - Each unit measures: Ozone (ppb)
    Unit cost: ~$4,500
  - Time resolution: 10-sec to 1-hr
  - Units IDs: 1043, 1105 and 1106

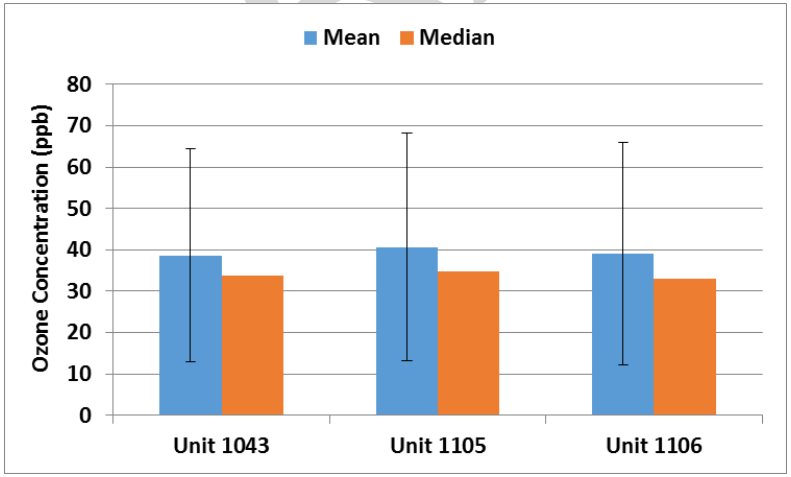
- SCAQMD FRM instrument:
  - Ozone instrument; cost: ~$7,000
  - Time resolution: 1-min

Data validation & recovery

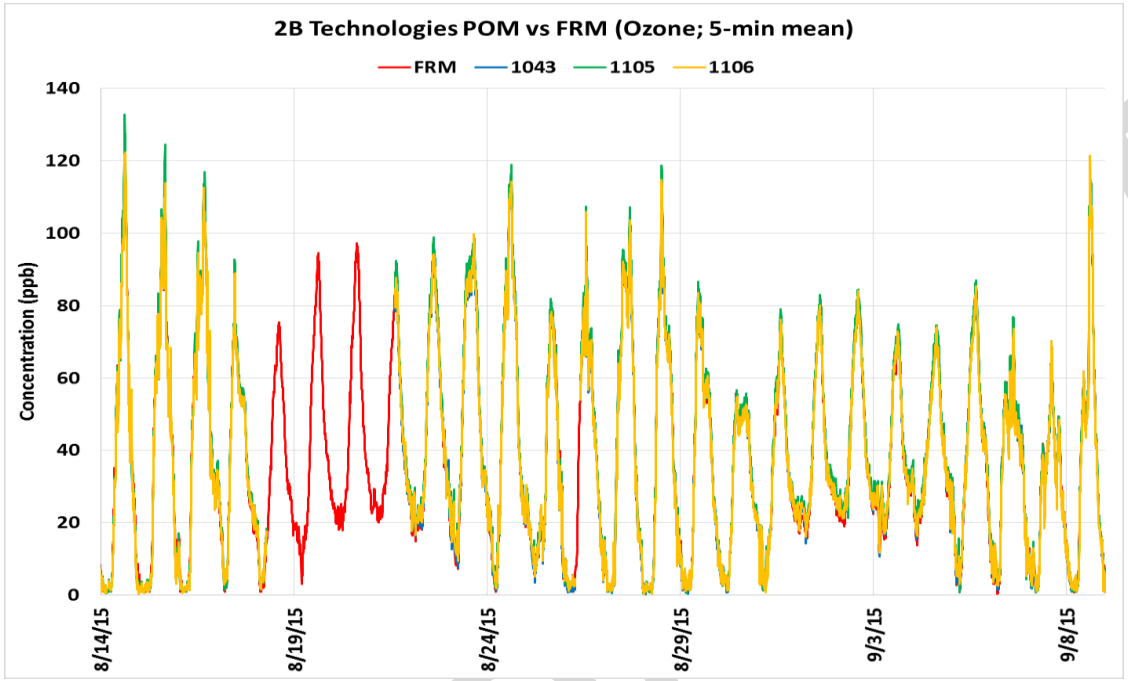
- Basic QA/QC procedures were used to validate the collected data (i.e. obvious outliers, negative values and invalid data-points were eliminated from the data-set)
- Data recoveries from units 1043, 1105, and 1106 were 99, 92, and 91%, respectively

2B Technologies PO_3M; intra-model variability

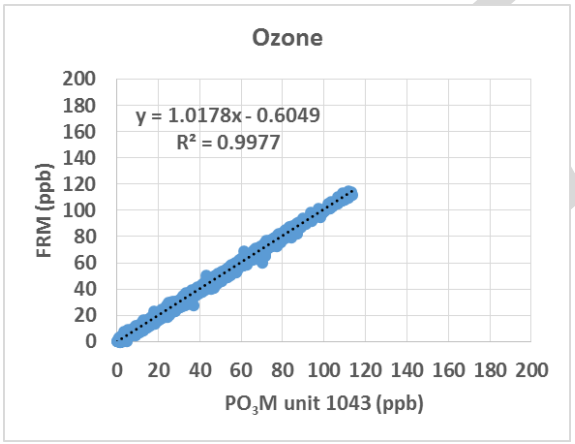
- Low measurement variability was observed between the three PO_3M units

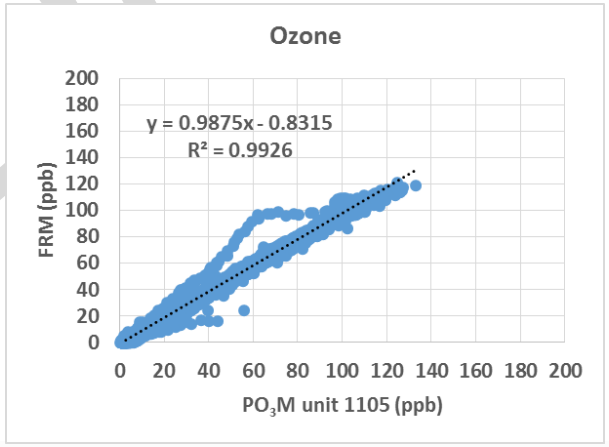


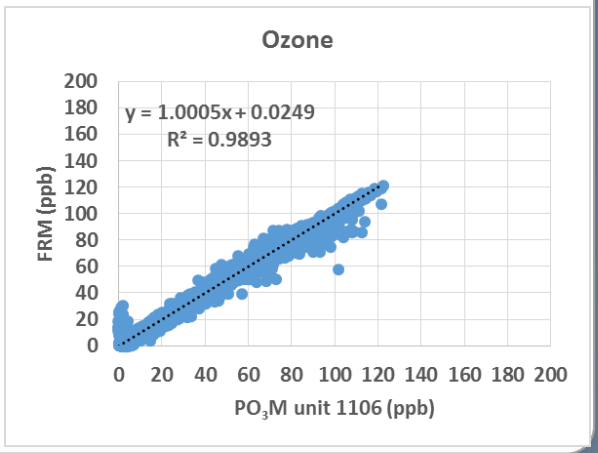
2B Technologies PO_3M vs FRM (Ozone; 5-min mean)



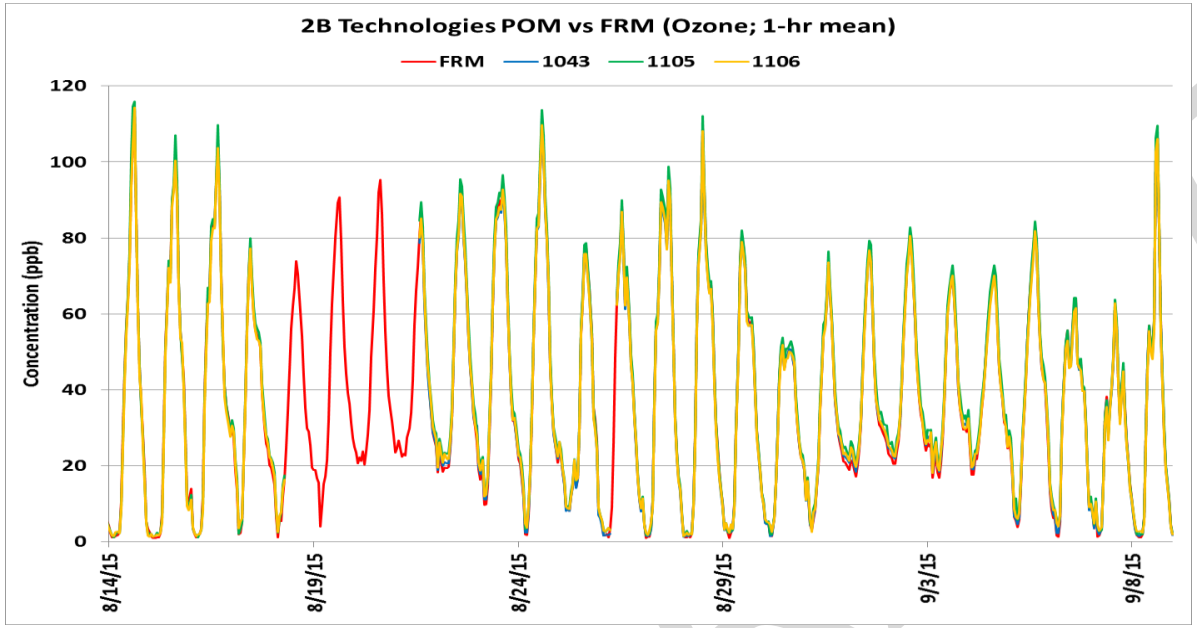
- Ozone measurements from the three PO_3Ms show an excellent correlation with the corresponding FRM data (R^2~1.00).







2B Technologies PO_3M vs FRM (Ozone; 1-hr mean)



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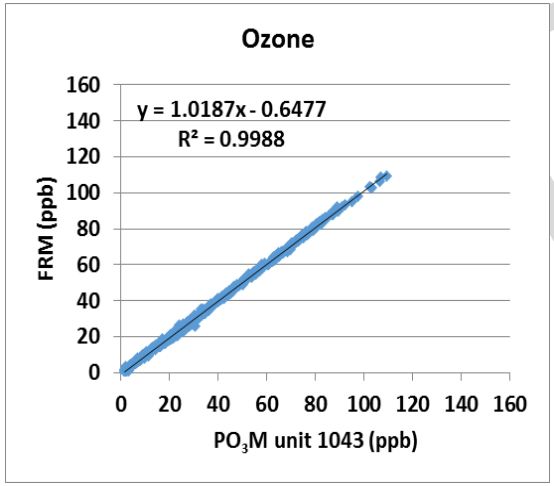
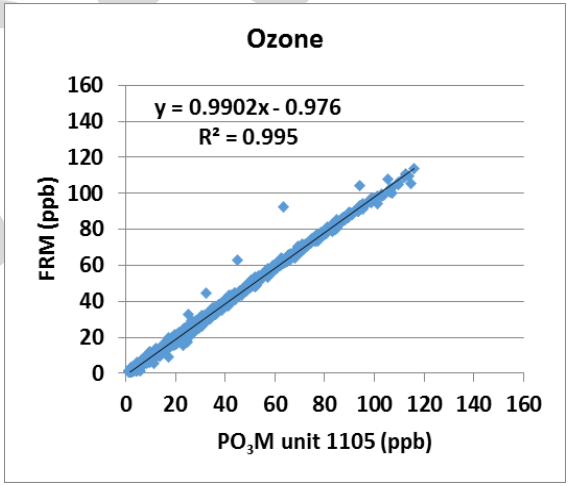
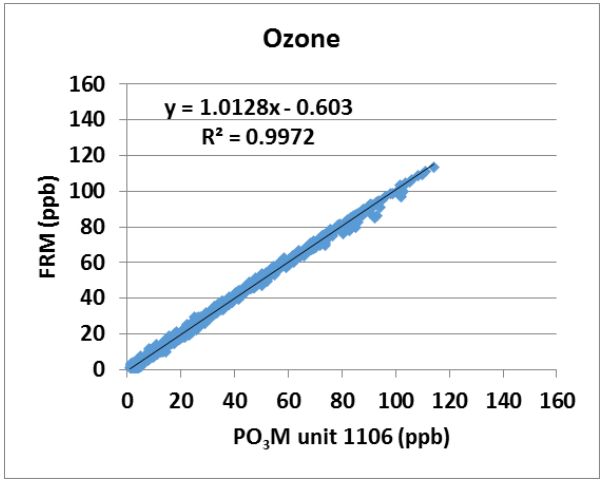
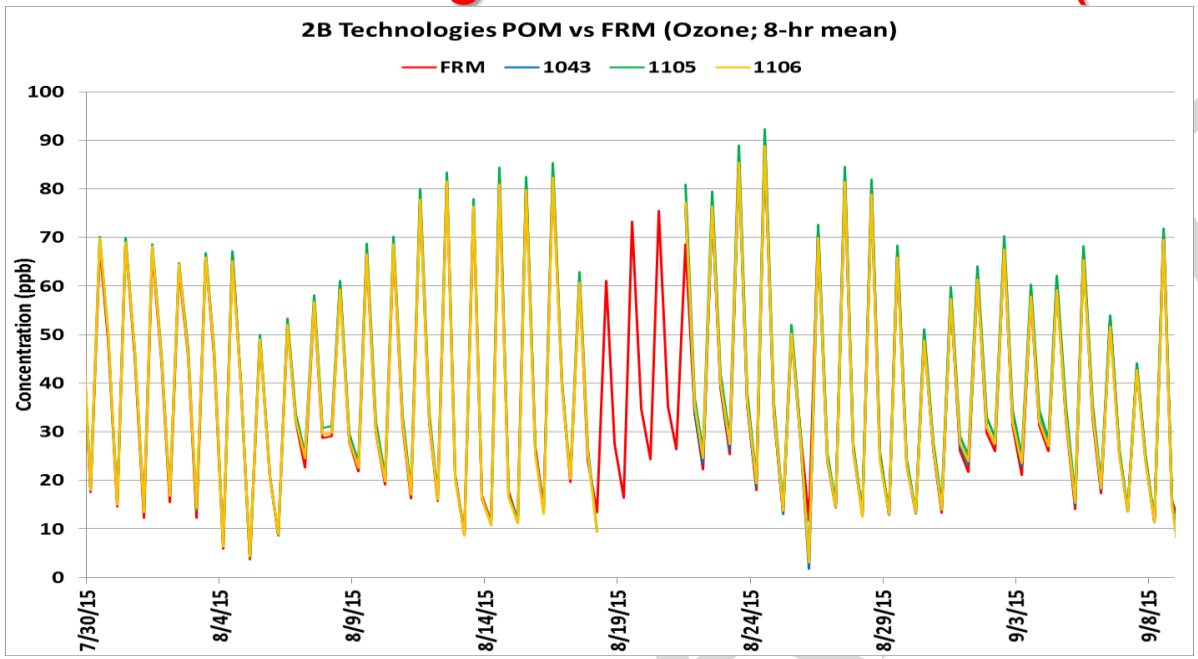






2B Technologies POM vs FRM (Ozone; 8-hr mean)



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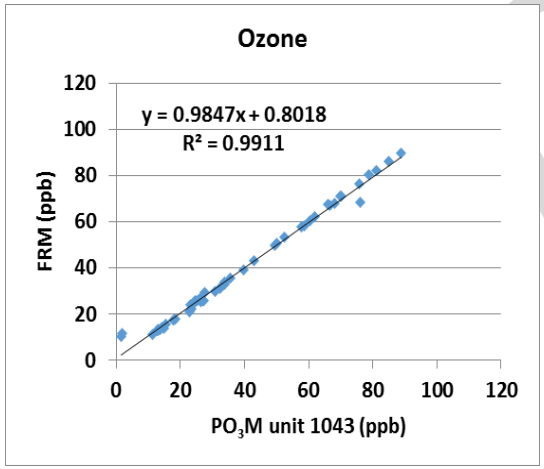

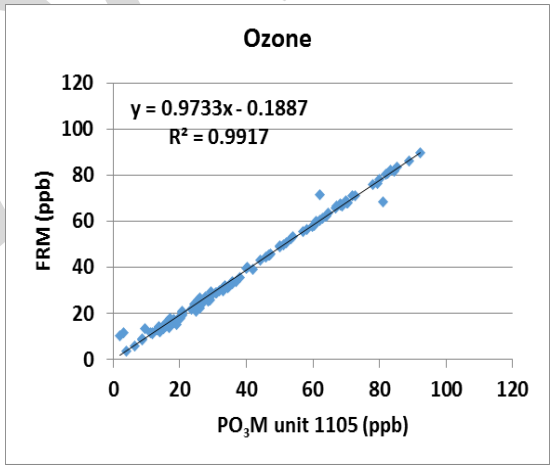

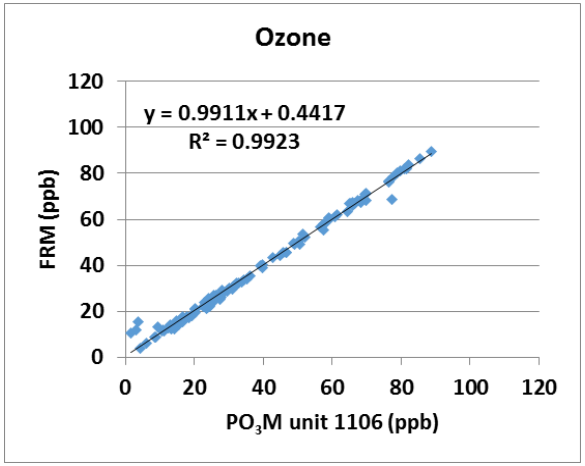

Discussion

- Overall, the three **2B Technologies PO_3M** Ozone sensors performed very well and showed:
  - Minimal down-time; data recovery from each unit was higher than 90%
  - Very low intra-model variability
- All three PO_3M units showed excellent correlation with a more expensive FRM instrument (R^2~1.00)
- No sensor calibration by AQ-SPEC was performed prior to the beginning of this field testing
- Laboratory chamber testing is necessary to fully evaluate the performance of these sensors under controlled temperature and relative humidity conditions, and in the presence of interfering species such as NO_2
- These results are still preliminary